
**Joseph J. Nocera - University of New Brunswick**

# Benefits and Risks of Agro-Ecosystem Management to Grassland Birds in Nova Scotia

Progress Report - March 2003

## BACKGROUND

Despite large-scale existing conservation programs, severe declines in many populations of grassland birds have continued over the last few decades. Many authors attribute these declines to a large net loss of hayfields and changes in timing and frequency of hay cutting. In some areas, approximately 95% of hayfields that were extant 50 years ago are no longer active. Concurrently, the median date of cutting the first hay crop is now 14-21 days earlier, and now overlaps directly with peak nesting of grassland birds in most regions.

Given such a conservation concern, we know little about what agricultural management practices best support populations of grassland birds. Therefore, study of the process behind habitat selection for these species is indispensable to identifying the highest quality habitats in managed agro-ecosystems.

To better understand these processes (and the resultant population-level patterns of concern to managers), my research will determine the habitat quality parameters that guide these selection processes. Therein, data is being obtained that will serve to support stewardship activities in agricultural grassland and wet meadow habitats, by addressing the direct demographic and behavioral responses of birds to agro-ecosystem management.

## OBJECTIVES

- Model habitat selection for breeding grassland birds in agricultural landscapes with such parameters as habitat type (composition and context) and connectivity.
- Model factors that contribute to area requirements of grassland birds in eastern Canada.
- Determine habitat use of certain grass types and habitat patches that proximally underlie habitat selection parameters (e.g. prey abundance, climate, etc.).
- Examine agricultural techniques that may most benefit breeding grassland birds in the

region (e.g. grass types, adjusted hay harvest dates, etc.).

- Evaluate wildlife habitat value of managed agro-ecosystems in Atlantic Canada to influence the delivery of successful habitat stewardship initiatives.

**2002 FIELD SEASON**

The main portion of the study was centered on the Belleisle Marsh in Annapolis County. To complement this site, two field sites were added: Queen Anne marsh and Upper Belleisle.

Breeding phenology in 2002 was similar to that determined in 2000-2001, with peak fledging occurring largely in first week of July for Bobolink, Savannah Sparrow, and Nelson's Sharp-tailed Sparrow. Therein, breeding activity appears greatest for Bobolinks in Belleisle, and lowest in Upper Belleisle. Conversely, Belleisle showed the least evidence of successful breeding for Savannah Sparrows, as Queen Anne had almost 83% of all known pairs (at that site) active in advanced breeding stages. Breeding Nelson's Sharp-tailed Sparrows showed little difference in abundance across sites.

Banding efforts were successful with 179 birds marked by colour bands. However, to increase the overall necessary sample size, banding effort will increase in 2003. Targeted efforts towards Bobolinks and Nelson's Sharp-tailed Sparrows are specifically warranted.

Approximately 50% of all colour-banded birds were re-observed after banding. We determined territory location and boundaries for 63 individual birds.

Prey sampling was particularly successful. All plots were sampled at regular intervals throughout the summer, and over 49,000 insects were collected and identified. As one would expect, the majority of arthropods captured in pitfall traps were terrestrial: spiders (Araneae), isopods (Isopoda), millipedes (Diplopoda), centipedes (Chilopoda), and earwigs (Dermaptera). Likewise, sweep-netting offered the most reliable means of capturing aerial arthropods: Odonata (dragonflies and damselflies), Neuroptera (lacewings), Orthoptera (grasshoppers), Diptera (flies), Lepidoptera (butterflies, moths), and Hemiptera (true bugs - particularly the numerous Meadow Plant-Bug (Hemiptera; Mirinae; *Leptopterna dolabrata* Linn.)).

Among sites, on a catch-per-unit-effort basis, we detected almost twice as many spiders and isopods in Upper Belleisle than in the other two sites. Twice as many harvestmen were detected in Queen Anne; however, this is the only site where dragonflies or damselflies were not captured. Four times as many grasshoppers were sampled in Queen Anne, and this is the only site where ticks and lacewings were sampled. Lastly, Belleisle was the only site where caddisflies were detected, likely because it is the site closest to water.

Habitat measures will need to be taken on an annual basis to better determine patterns, trends, and growth rates. However, in 2002, the typical habitat patch across study sites represents adequate vegetation structure (e.g. ~20% forb cover) for breeding in grassland birds.

Hay harvest is perhaps the single most detrimental activity to breeding grassland birds. It is of significant interest that the field sites used in this study all have comparatively late

harvest dates. Whereas public land in Belleisle has a mandatory delayed harvest date of 1 July, it is also cut the earliest. Upper Belleisle has the same mandatory delayed harvest, but was not cut until a full three weeks after that date. Further, private land in Queen Anne has no mandatory delayed hay date, but the majority of harvest started only on 10 July.

## COMMUNICATIONS

Nocera, J.J. "The Ideal-free Distribution - it's not free, but is it Ideal? A test of the importance of Public Information using settlement patterns in grassland birds". NE Wildl. Graduate Student Conf., Univ. New Brunswick, Fredericton, NB. 1-3 Mar 2002.

Nocera, J.J., G.J. Forbes and G.R. Milton. "Habitat selection in grassland birds: a test of the importance of Public Information to Ideal-free Distribution". Annual Meetings of the Assoc.Field Ornithologists & Wilson Ornithological Soc., Florida Gulf Coast Univ. & Corkscrew Swamp Sanctuary, Fort Myers, FL, USA. 11-14 Apr 2002.

## ACKNOWLEDGEMENTS

This study is supported by the generous contributions of:

- Nova Scotia Habitat Conservation Fund ($13,800)
- Nova Scotia Department of Natural Resources (G.R. Milton)
- Wildlife Habitat Canada
- Canadian Wildlife Federation
- Canadian Wildlife Service - Atlantic Region (Dr. A. Hanson)
- University of New Brunswick (Dr. G. Forbes)

*Joseph J. Nocera*
*University of New Brunswick*

**Date of Post: April 2003**